

## CLAIMS

WHAT IS CLAIMED IS:

1. A system for flushing a vascular site with a fluid, said system comprising:
  - (I) a first four-lumen catheter comprising:
    - (A) a proximal end;
    - (B) a distal end; and
    - (C) a five-port manifold located at said proximal end, wherein:
      - (i) said five-port manifold comprises at least four ports having luer-type connectors and a fifth port comprising a sealing element for producing a sealing engagement around a tubular element inserted therethrough; and
      - (ii) said proximal and distal ends are separated by a non-coaxial four-lumen tube; and
  - (II) a guidewire inserted through said fifth port and present in one of said four lumens.
2. The system according to Claim 1, wherein said guidewire is a hollow guidewire comprising at least one lumen.
3. The system according to Claim 2, wherein said hollow guidewire includes a vascular occlusion element at a distal end.
4. The system according to Claim 3, wherein said vascular occlusion element is a balloon.
5. The system according to Claim 1, wherein said sealing element of said central port produces a sealing engagement with said guidewire when inserted therethrough.
6. The system according to Claim 5, wherein said sealing element comprises a Touhy-Borst valve.

7. The system according to Claim 1, wherein one of said ports of said five-port manifold of said first multilumen catheter is in fluid communication with a negative pressure source.
8. The system according to Claim 1, wherein one of said ports of said five-port manifold of said first multilumen catheter is in fluid communication with a balloon inflation mechanism.
9. The system according to Claim 1, wherein one of said ports of said five-port manifold of said first multilumen catheter is in fluid communication with a dissolution solution attenuating solution fluid reservoir.
10. The system according to Claim 1, wherein one of said ports of said five-port manifold of said first multilumen catheter is in fluid communication with a dissolution solution fluid reservoir.
11. A multilumen catheter comprising:
  - (a) a proximal end;
  - (b) a distal end; and
  - (c) a five-port manifold located at said proximal end, wherein:
    - (i) said five-port manifold comprises at least four ports with luer-type connectors and a fifth port comprising a sealing element that forms a sealing engagement with a guidewire when inserted therethrough; and
    - (ii) said proximal and distal ends are separated by a non-coaxial four-lumen tube.
12. The multilumen catheter according to Claim 11, wherein a vascular occlusion mechanism is associated with said distal end.
13. The multilumen catheter according to Claim 12, wherein said vascular occlusion mechanism is a balloon.

14. The multilumen catheter according to Claim 11, wherein two of said ports of said five-port manifold are in fluid communication with the same lumen of said multilumen catheter.
15. The multilumen catheter according to Claim 11, wherein said sealing element is a Touhy-Borst valve.
16. The multilumen catheter according to Claim 11, wherein one of said ports of said five-port manifold of said multilumen catheter is in fluid communication with a negative pressure source.
17. The multilumen catheter according to Claim 11, wherein one of said ports of said four-port manifold of said multilumen catheter is in fluid communication with a balloon inflation mechanism.
18. The multilumen catheter according to Claim 11, wherein one of said ports of said manifold of said multilumen catheter is in fluid communication with a dissolution fluid attenuating fluid reservoir.
19. The multilumen catheter according to Claim 11, wherein one of said ports of said manifold of said multilumen catheter is in fluid communication with a dissolution solution fluid reservoir.
20. A kit for use in flushing a vascular site with fluid, said kit comprising:
  - (I) a first four-lumen catheter comprising:
    - (A) a proximal end;
    - (B) a distal end; and
    - (C) a five-port manifold located at said proximal end, wherein:
      - (i) said five-port manifold comprises at least four ports having luer-type connectors and a fifth port comprising a sealing element for producing a sealing engagement around a tubular element inserted therethrough; and

- (ii) said proximal and distal ends are separated by a non-coaxial four-lumen tube; and
- (II) a guidewire.

21. The kit according to Claim 20, wherein said guidewire is a hollow guidewire comprising at least one lumen.

22. The kit according to Claim 21, wherein said hollow guidewire includes a vascular occlusion element at a distal end.

23. The kit according to Claim 23, wherein said vascular occlusion element is a balloon.

24. The kit according to Claim 20, wherein said kit further comprises a dissolution fluid or a component(s) thereof.

25. The kit according to Claim 20, wherein said dissolution solution is an acidic solution.

26. The kit according to Claim 20, wherein said kit further comprises a dissolution solution attenuating solution or a component(s) thereof.

27. The kit according to Claim 26, wherein said attenuating solution is a buffer solution.

28. The kit according to Claim 20, wherein said kit further comprises a recording medium having recorded thereon instructions for using said kit to treat a vascular lesion or mechanism for obtaining said instructions from a remote location.

29. A method for flushing a vascular site with a fluid, said method comprising:  
(a) introducing a system according to Claim 1 into a patient in a manner such that the distal ends of said multilumen catheters of said system are located at said vascular site; and

(b) flushing said vascular site with at least one fluid by introducing fluid into and removing fluid from said vascular site through the lumens of said system.

30. The method according to Claim 29, wherein said method is a method for treating a vascular lesion.

31. The method according to Claim 30, wherein said vascular lesion is a calcified vascular lesion.

32. The method according to Claim 29, wherein said method comprises flushing said vascular site with at least an acidic dissolution fluid.

33. The method according to Claim 29, wherein said vascular site is also flushed with a pH elevating solution.

34. The method according to Claim 33, wherein said pH elevating solution is a buffer solution.